SYSTEM

SURVEILLANCE

INDICATORS

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System Surveillance Indicators

Purpose of Workshop

- Gain insight into how metrics can streamline the system surveillance process

- Demonstrate use of system metrics

- Share metrics being used at your location

- Provide opportunity to develop additional metrics

System Surveillance Indicators

Why do we do System Surveillance?

• The intent of system surveillance is to monitor the continuity, consistency, reliability, and effectiveness of the management control system

• How? System surveillance efforts should be risk-based

• Tools? Metrics or "Indicators", identify

System Surveillance Indicators

Identifying System Risk

- Does supplier use the EV data to manage?

- Are EV processes institutionalized?

- Is there an adequate training program?

- Are the same types of problems occurring in more than one program?

  - Inadequate planning, excessive replanning, overruns, inadequate EACs, timeliness of change incorporation

System Surveillance Indicators

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Insight into Development and Use of
System Surveillance Indicators

- Presentation by Capt John Bosworth, DCMC Boeing Seattle

Areas we'll Discuss

- History at Boeing Seattle

- Process Assessment System Overview

- Current Metrics

- Some "Rejected" Metrics

- Lessons Learned

History at Boeing Seattle

- Advance Agreement/Joint Surveillance Guide

- Areas of Interest - AOIs
  - 2 processes (cost, schedule)
  - 5 sub-processes within the cost area
- Process Assessment System (PAS)
  - Integrated Cost and Schedule Process (#11 of 13 areas across the company)
  - Initially 5 sub-processes, now 3 but going to 4
  - "Rolls up" to Boeing Aircraft & Missiles Process Assessment

Process Assessment System Overview

- Purpose: Generate a top level view of the key processes used in the Boeing Aircraft and Missiles (A&M) business unit.

- Uses stoplight-formatted metrics to draw attention to areas needing further attention.

- Shows status of the key sub-processes within Earned Value Management.

- Answers the question: How well is the supplier implementing EVM techniques and processes at the site?

PAS Metrics

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PAS #11
Integrated Cost & Schedule

Universe: CPR/C/SSR reported contracts between 5% - 95% complete (currently 8 contracts)

Weight

1. **Baseline (5 metrics in sub-process)	30%**

2. **Estimates at Completion (4 metrics in sub-process)   30%**

3. **Surveillance**

4. **Performance (cost & schedule)**

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Sub-Process 1 - Baseline

1.a. Use of Management Reserve (MR) budget as a percent of   to-go effort.

   Monthly percentage change

      up to 5%   GREEN

      > 5% to 10%   YELLOW

      > 10%   RED

Purpose: Heavy use of MR has been shown to be an indication of performance problems. Examples: numerous out-of-scope changes to the original plan, authorized but un-budgeted customer directed changes

Metric weighting: 6%

PAS #11
Sub-Process 1 - Baseline

b. Differences in percent complete of budget and percent   spent of EAC.

Monthly percentage change

up to 8%   **GREEN**

> 8% to 15%   **YELLOW**

> 15%   **RED**

Purpose: Large differences indicate poor performance measurement practices or an EAC that is not accurate.

Metric weighting: 6%

PAS #11
Sub-Process 1 - Baseline

c. Percentage of Budget Revisions (BRs) affecting the current month (excluding contractual, material, mfg. BRs)

None	**GREEN**
> 0% up to 5%	**YELLOW**
Over 5%	**RED**

Purpose: Excessive re-planning in the current month is an indication of poor baseline planning, either in the initial baseline activity or late planning of near term

Metric weighting: 6%

PAS #11
Sub-Process 1 - Baseline

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d. Timeliness of Class 1 change incorporation.

     2 months or less   **GREEN**

     3 months or less   **YELLOW**

     More than 3 months   **RED**

Purpose: Looks at the time it takes for the program to budget and firm plan program change activities. If no Class 1 activity, metric is considered green. When multiple Class 1 changes, rating is based on the oldest authorized. Includes restructures, excludes unallocated budgets pending negotiations.

Metric weighting: 6%

PAS #11
Sub-Process 1 - Baseline

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e. Timeliness of SCR incorporation

85% to 100%   **3 - GREEN**

70% to 85%   **2 - YELLOW**

less than 70%   **1 - RED**

Purpose: Percentage measurement of completing SCRs within   a 45 calendar day window.

Metric weighting: 6%

Process Assessment System #11
Integrated Cost and Schedules
June 1999

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	Key Sub-Processes											Surveillance	Comp-osite
	Baseline						EAC						
	(30%) / 1.a	1.b	1.c	1.d	1.e	(30%)	2.a	2.b	2.c	2.d	3 (40%)	
Group 1													
Program 1	3.0 / 3.0 / 3	3	3	3	3	3.0 / 3.0	3	3	3	3	3.0 / 3	3.0 / 3.0
Program 2	3.0 / 3.0 / 3	3	3	3	3	2.8 / 2.8	3	3	3	2	3.0 / 3	2.9 / 2.9
Program 3	3.0 / 3.0 / 3	3	3	3	3	2.3 / 2.3	3	2	3	1	3.0 / 3	2.8 / 2.8
Program 4	3.0 / 3.0 / 3	3	3	3	3	2.8 / 2.8	2	3	3	3	3.0 / 3	2.9 / 2.9
Program 5	3.0 / 3.0 / 3	3	3	3	3	3.0 / 3.0	3	3	3	3	3.0 / 3	3.0 / 3.0
Group 1 Subtotal	3.0 / 3.0 / 3.0	3.0	3.0	3.0	3.0	2.8 / 2.8	2.8	2.8	3.0	2.4	3.0 / 3.0	2.9 / 2.9
Group 2												
Program A	2.6 / 2.6 / 3	3	1	3	3	2.8 / 2.8	3	3	3	2	2.0 / 2	2.4 / 2.4
Program B	3.0 / 3.0 / 3	3	3	3	3	3.0 / 3.0	3	3	3	3	3.0 / 3	3.0 / 3.0
Group 2 Subtotal	2.8 / 2.8 / 3.0	3.0	2.0	3.0	3.0	2.9 / 2.9	3.0	3.0	3.0	2.5	2.5 / 2.5	2.7 / 2.7
Group 3												
Program 1	3.0 / 3.0 / 3	3	3	3	3	2.0 / 2.0	1	3	3	1	3.0 / 3	2.7 / 2.7
Totals as Percentages	98.3 / 100.0	100.0	91.7	100.0	100.0	89.6	87.5	95.8	100.0	75.0	95.8	94.7
	98.3 / 100.0	100.0	91.7	100.0	100.0	89.6	87.5	95.8	100.0	75.0	95.8	94.7

Program Rating based on: 3.0-2.5 = Green   2.49-1.5 = Yellow   Below 1.5 = Red
Boeing/DCMC rating based on: 100-90% = Green   89-80% = Yellow   Below 80% = Red

Legend:
1a: Use of M/R as % of BCWR   2a: CPI-TCPI (@PMB)=% delta
1b: Diff % compl. to % spent   2b: % diff to calculated EAC
1c: % BRs in current Mo.   2c: Timeliness of EAC
1d: Timeliness of change incorp.   2d: Schedule ETC
1e: Timeliness of SCR incorp.   3: EVMS Joint Surveillance Process Risk

PAS #11
Sub-Process 2 - EAC

2.a. Compare Cost Performance Index (CPI) and To   Complete Performance Index (TCPI-LRE).

(CPI-TCPI (@ PMB) = % Absolute Delta)

Less than 10% delta   GREEN

10% - 20% delta   YELLOW

Greater than 20% delta   RED

Purpose: Indicates the health of the EAC process, reflecting incorporation of the cum to date performance into the EAC by comparing

Sub-process weighting: 7.5%

PAS #11
Sub-Process 2 - EAC

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2.b. Compare supplier's % variance at completion to PST   variance at completion

   5% or Less delta   GREEN

   5% - 10% delta   YELLOW

   Greater than 10% delta   RED

Purpose: Indicates the health of the EAC process by comparing to DCMC Program Support Team EAC. (Boeing uses the average of 3 calculated variances at completion.)

Metric weighting: 7.5%

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Sub-Process 2 - EAC

2.c. Timeliness of performance and incorporation of grassroots   or comprehensive EAC

On time	**GREEN**
1 month late	**YELLOW**
2 or more months late	**RED**

Purpose: This compares the documented (PEP or Program Instruction) EAC cycle to that performed by the program. If Program Management has determined that an EAC is not necessary due to an assessment of the EAC, this must be documented in a memo from the PM to the CAMs.

Metric weighting: 7.5%

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Sub-Process 2 - EAC

2.d. Schedule Estimate-To-Complete (TSPI?)

    less than 105%   **GREEN**

    105% to 110%   **YELLOW**

   greater than 110%   **RED**

Purpose: **To indicate a program's required future schedule performance indices.**

Metric weighting: 7.5%

Process Assessment System #11
Integrated Cost and Schedules
June 1999

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	Key Sub-Processes												Surveillance		Composite	
	Baseline						EAC									
	(30%)		1.a	1.b	1.c	1.d	1.e	(30%)		2.a	2.b	2.c	2.d	3 (40%)			
Group 1																	
Program 1	3.0	3.0	3	3	3	3	3	3.0	3.0	3	3	3	3	3.0	3	3.0	3.0
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Group 1 Subtotal	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.8	2.8	2.8	2.8	3.0	2.4	3.0	3.0	2.9	2.9
Group 2																	
Program A	2.6	2.6	3	3	1	3	3	2.8	2.8	3	3	3	2	2.0	2	2.4	2.4
Program B	3.0	3.0	3	3	3	3	3	3.0	3.0	3	3	3	3	3.0	3	3.0	3.0
Group 2 Subtotal	2.8	2.8	3.0	3.0	2.0	3.0	3.0	2.9	2.9	3.0	3.0	3.0	2.5	2.5	2.5	2.7	2.7
Group 3																	
Program 1	3.0	3.0	3	3	3	3	3	2.0	2.0	1	3	3	1	3.0	3	2.7	2.7
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1d: Timeliness of change incorp.
1e: Timeliness of SCR incorp.

2a: CPI-TCPI (@PMB)=% delta
2b: % diff to calculated EAC
2c: Timeliness of EAC
2d: Schedule ETC
3: EVMS Joint Surveillance Process Risk

PAS #11
Sub-Process 3 - Surveillance

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Earned Value Management System Risk Assessment

- **Identifies process risk**

- **Accomplished via monthly joint surveillance activities**

  » **No additional data input req'd from programs**

- **Performed on all 10 earned value**

Sub-Process weighting: 40%

Purpose: Provides basis for management systems & DCMC evaluation of risk inherent in the implementation

"Rejected" Metrics

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PAS #11
Sub-process 4 - Performance

Supplier Cost-at-Completion Variance

0% or better (under-run) = **GREEN**

Up to 7% overrun contracts = **YELLOW**

Greater than 7% overrun = **RED**

Purpose: Measure performance to contract cost objectives.

~~Management System of DCMC not in flexibility to~~

Metric weighting: 0%

~~revise mechanical scores for this metric.~~

PAS #11
Sub-process 5 - Milestones

Milestones

85% to 100%	**3 - GREEN**
70% to 85%	**2 - YELLOW**
less than 70%	**1 - RED**

Purpose: To measure the percentage of milestones that meet schedule commitments.

Metric weighting: 0%

Lessons Learned

- *Process* Metrics, not program performance metrics

- Metrics must evolve

- Clarity of presentation a must

- Metrics captured at the program level, analyzed across the supplier

System Surveillance Indicators

Workshop

- Goal: Define some metrics for assessing the health of a supplier's implementation of EVMS

- Review: What does it take to make a good metric?

- Brainstorm a reporting framework:
  - Sub-processes?
  - Time phased?

- Share metrics you currently use

- Brainstorm other potential metrics that

In Closing . . .

Streamline your surveillance efforts by

focusing your efforts by

collecting the right **metrics**!